

DEVICE AND METHOD FOR IMPROVED LONG TERM SIGNAL ATTENUATION PERFORMANCE OF FIBER OPTIC CABLE AND APPARATUS INTERFACES

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Inventor(s): TUMINARO RAYMOND D
Applicant(s): TYCOM US INC (US)
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Abstract

The present invention is directed to a method and apparatus for improved long term signal attenuation performance of fiber optic cable and cable and/or fiber interface components. The improved long term signal attenuation performance of the fiber optic cable is achieved by introducing an additive that will occupy defect sites in the optical fibers, such as deuterium, into materials used in the fiber optic cable, either prior to or during the assembly process. The fiber optic cable casing structure then acts as a reaction chamber so that the additive which has been introduced during the fiber optic cable assembly process will react with the optical fibers so as to occupy defect site locations in the optical fibers. for example, the reaction of silica defect sites with deuterium improves the long term stability of the attenuation characteristics of the fiber optic cables because the number of defect sites available for hydrogen molecules to react with are reduced. According to one exemplary embodiment of the invention deuterium is introduced into a fill material used in the fiber optic cable, further, the material into which deuterium is introduced may be an embedding material into which the optical fibers are embedded within the casing of the fiber optic cable. The deuterium may be introduced into the material by dissolving the deuterium into the material or bubbling the material with deuterium. In another exemplary embodiment of the invention, deuterium is introduced into a fiber optic apparatus housing, which contains fiber optic components, prior to sealing the housing. According to a still further exemplary embodiment of the invention, deuterium is introduced into the fiber optic cable by exposing the optical fibers to deuterium prior to assembling the optical fibers into a fiber optic cable. In any case, during the cabling process and over time the deuterium retained within the fiber optic cable will react and combine with the defect sites in the optical fibers so that hydrogen has a low probability of reacting at those same defect sites, thereby improving the long term stability of the attenuation characteristics of the optical fibers, fiber optic cable and/or optical fiber components housed within apparatus cases.

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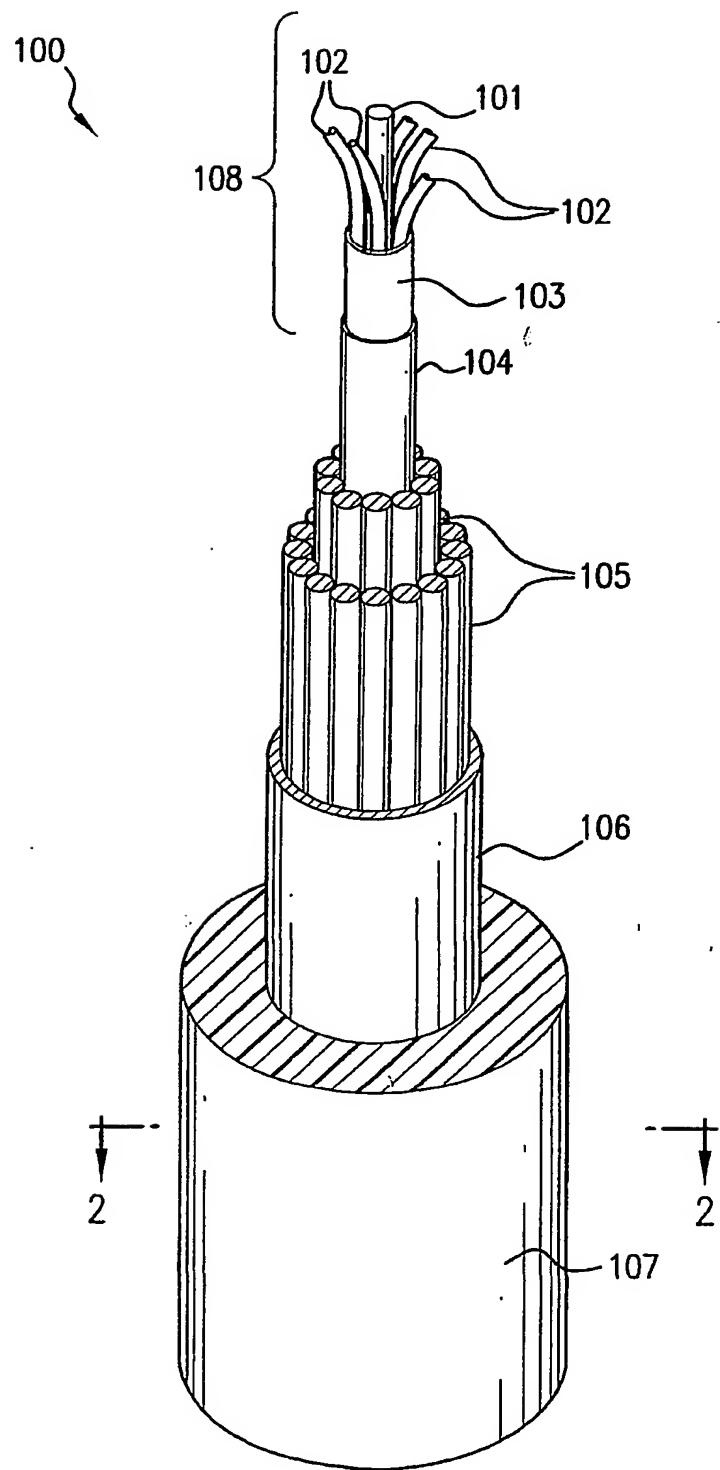


FIG.1

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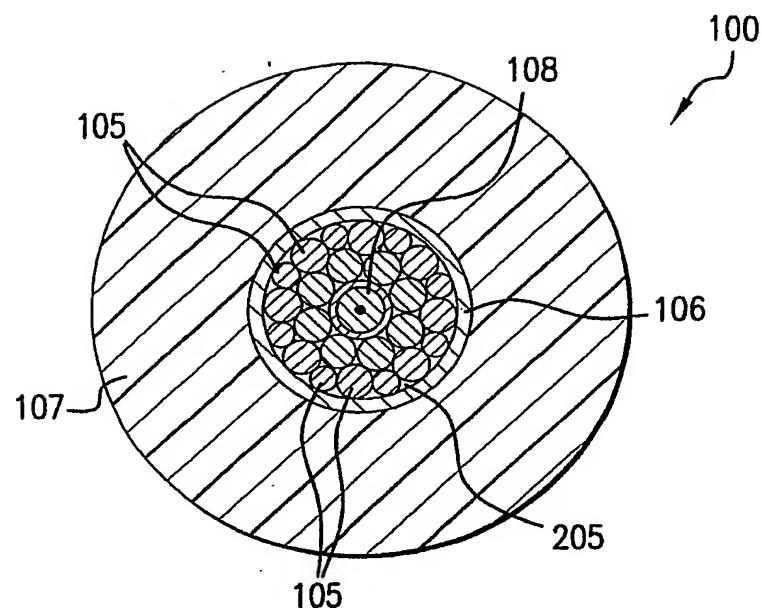


FIG.2

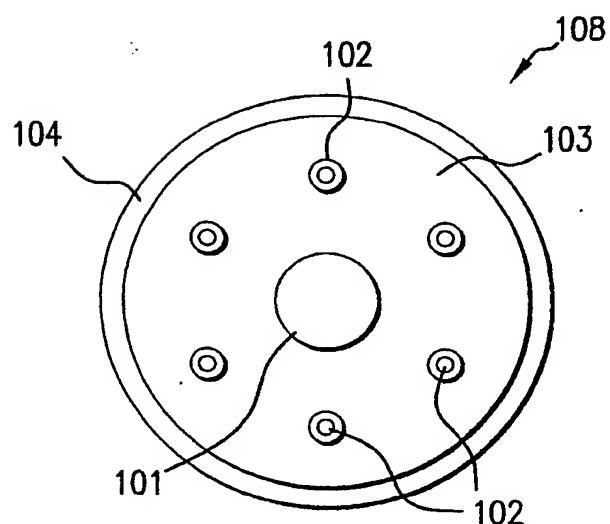


FIG.3

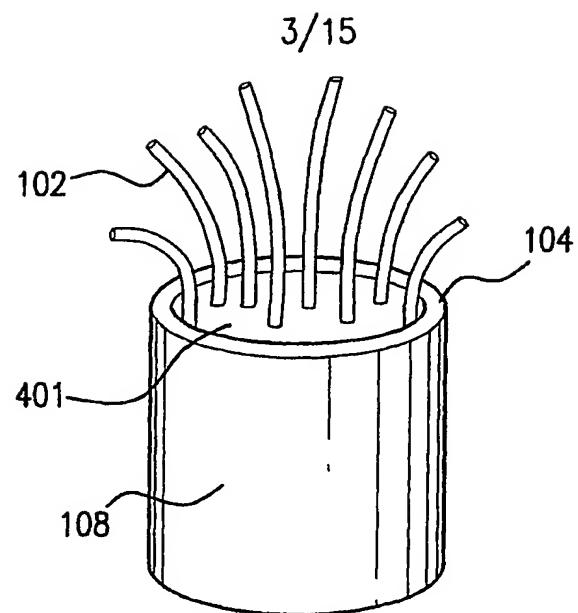


FIG.4

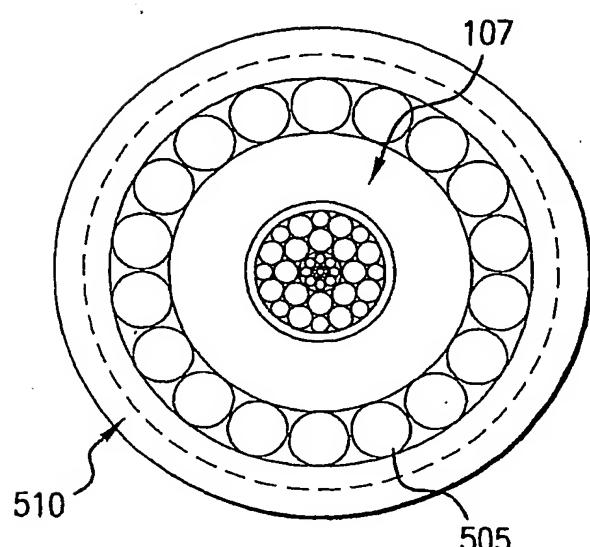


FIG.5

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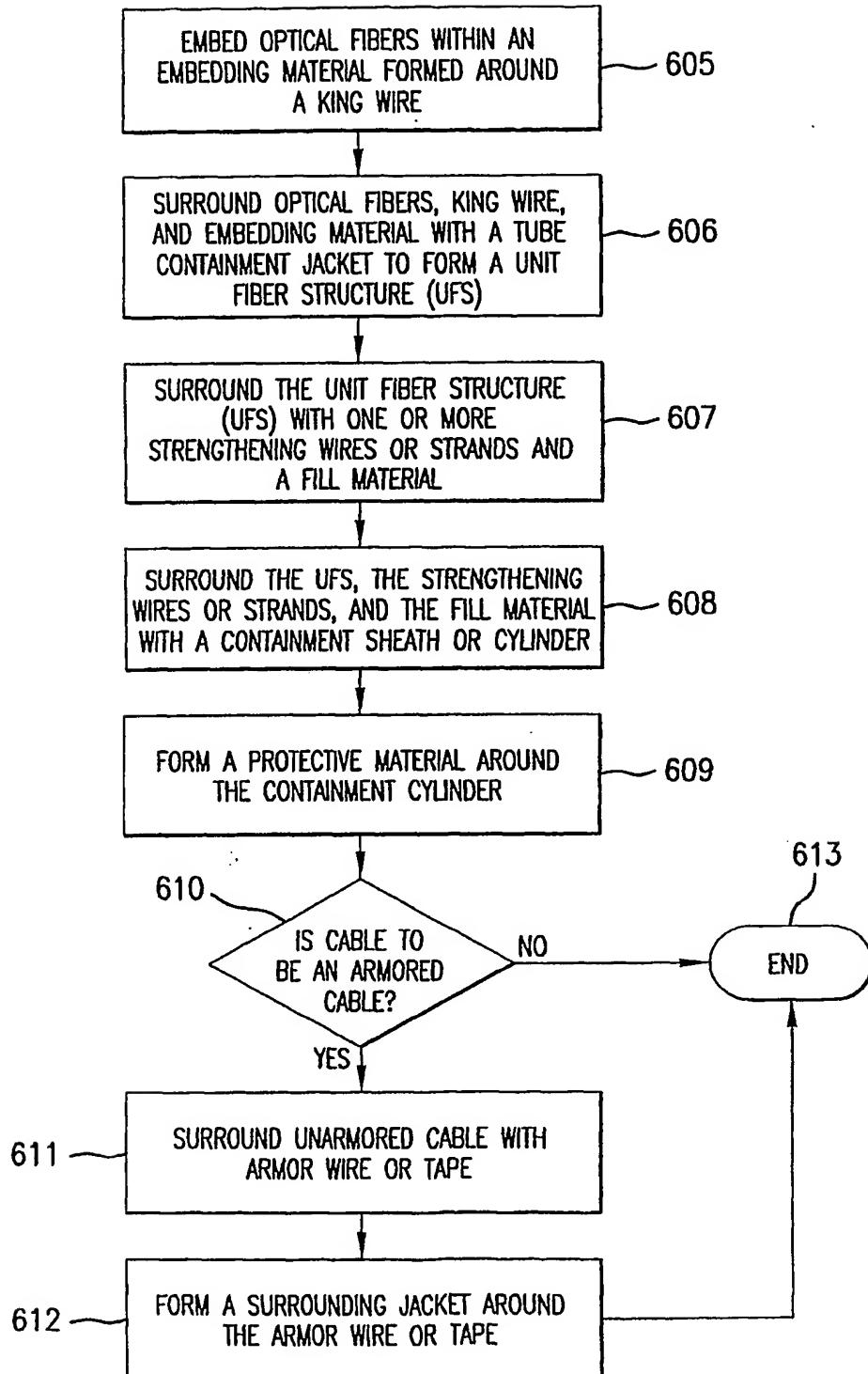


FIG.6

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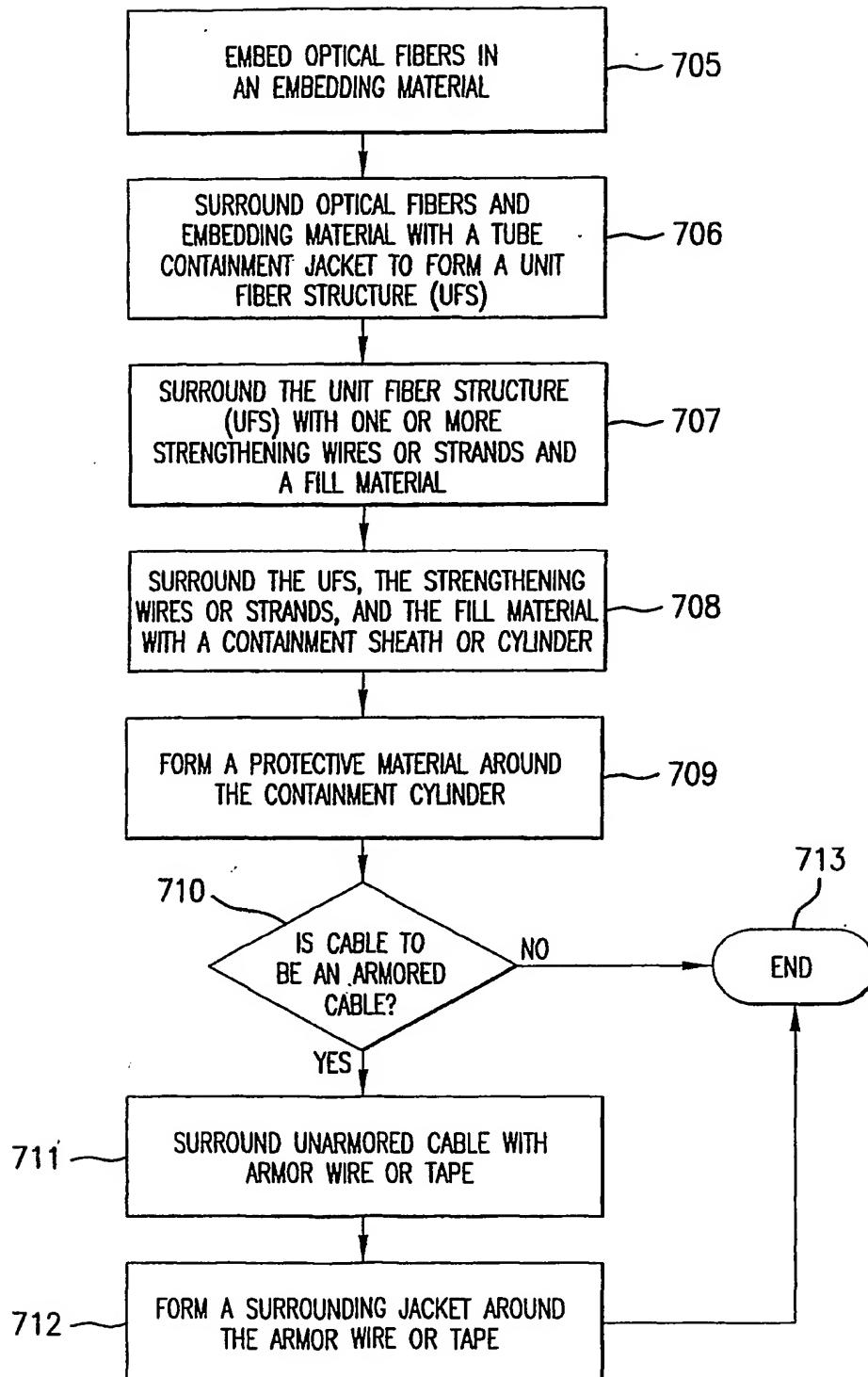


FIG.7

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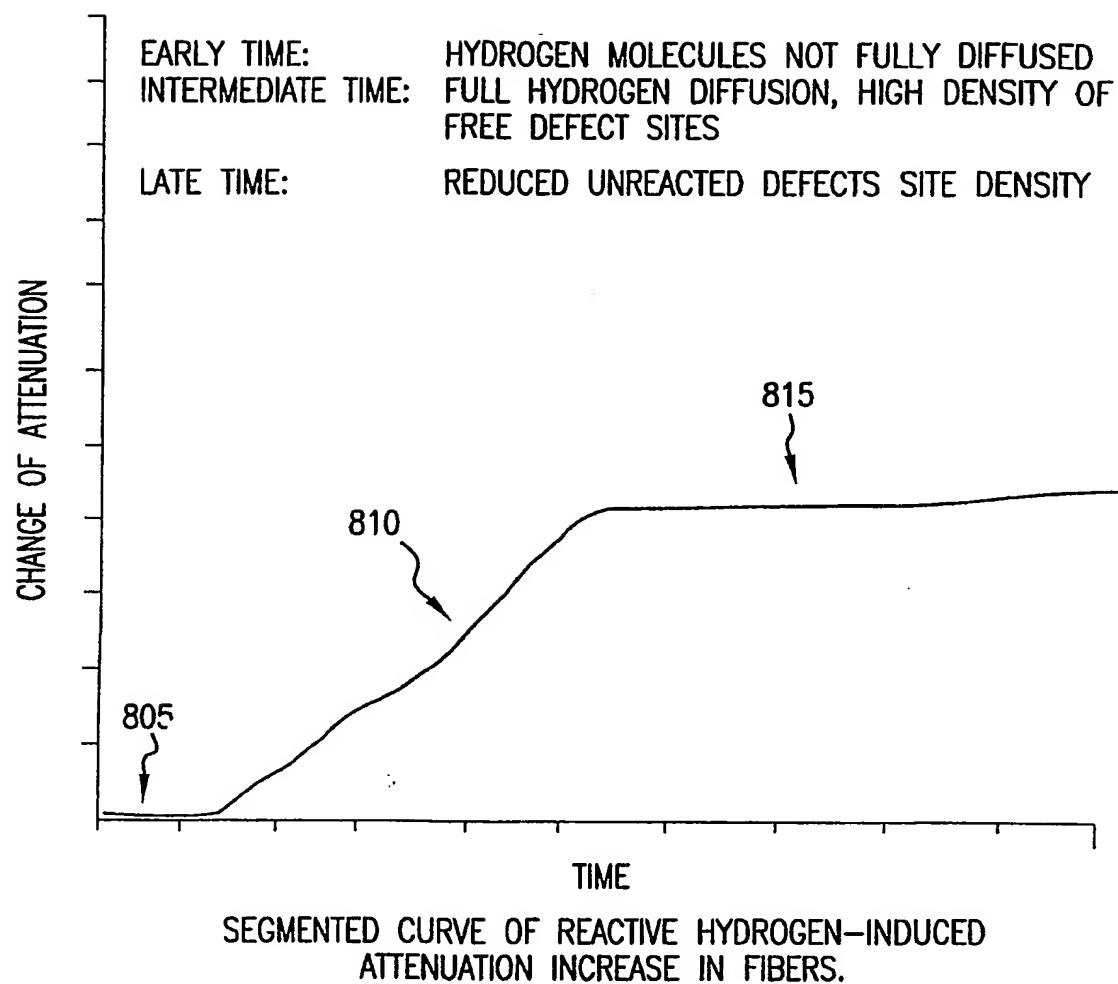


FIG.8

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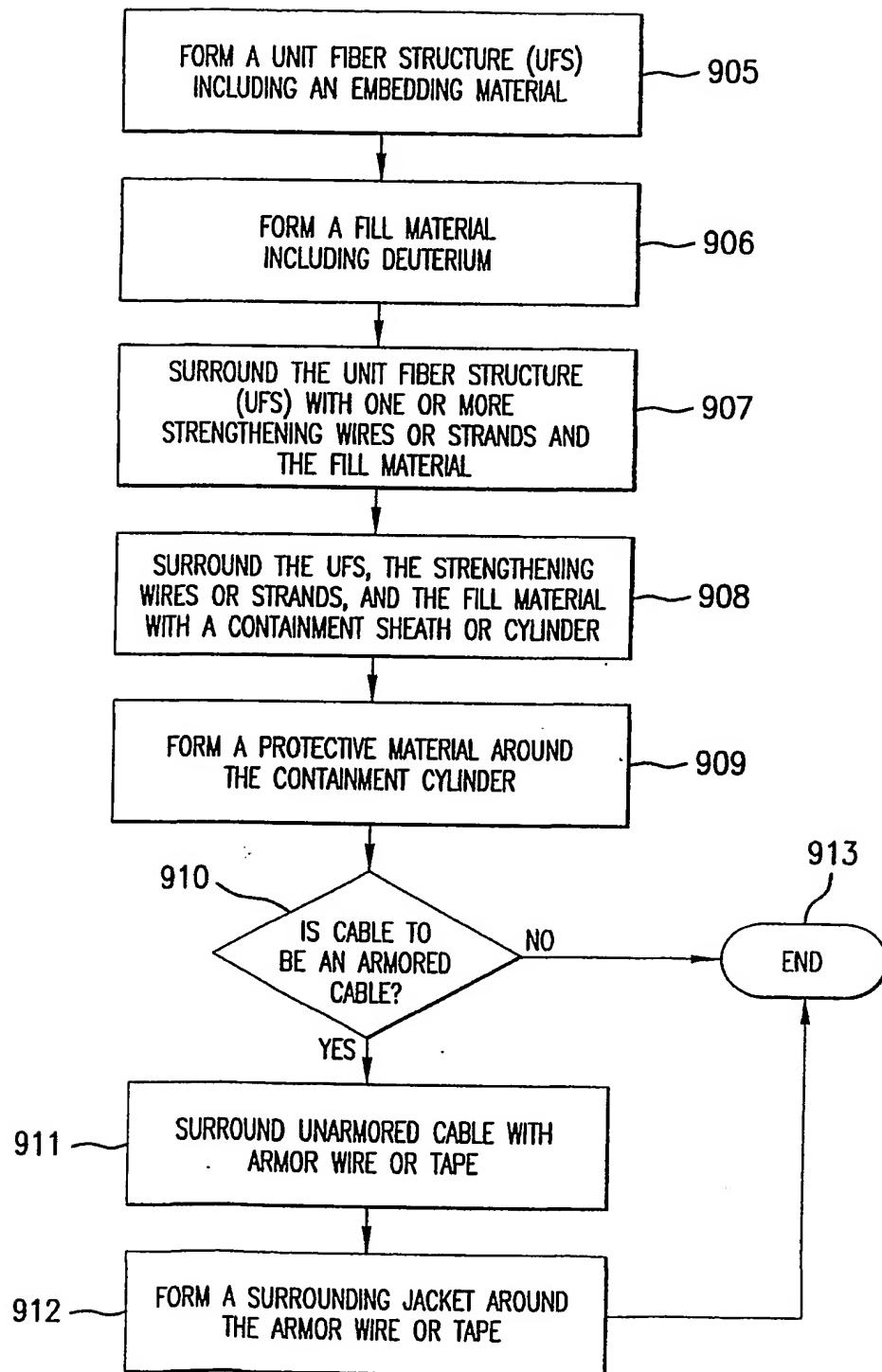
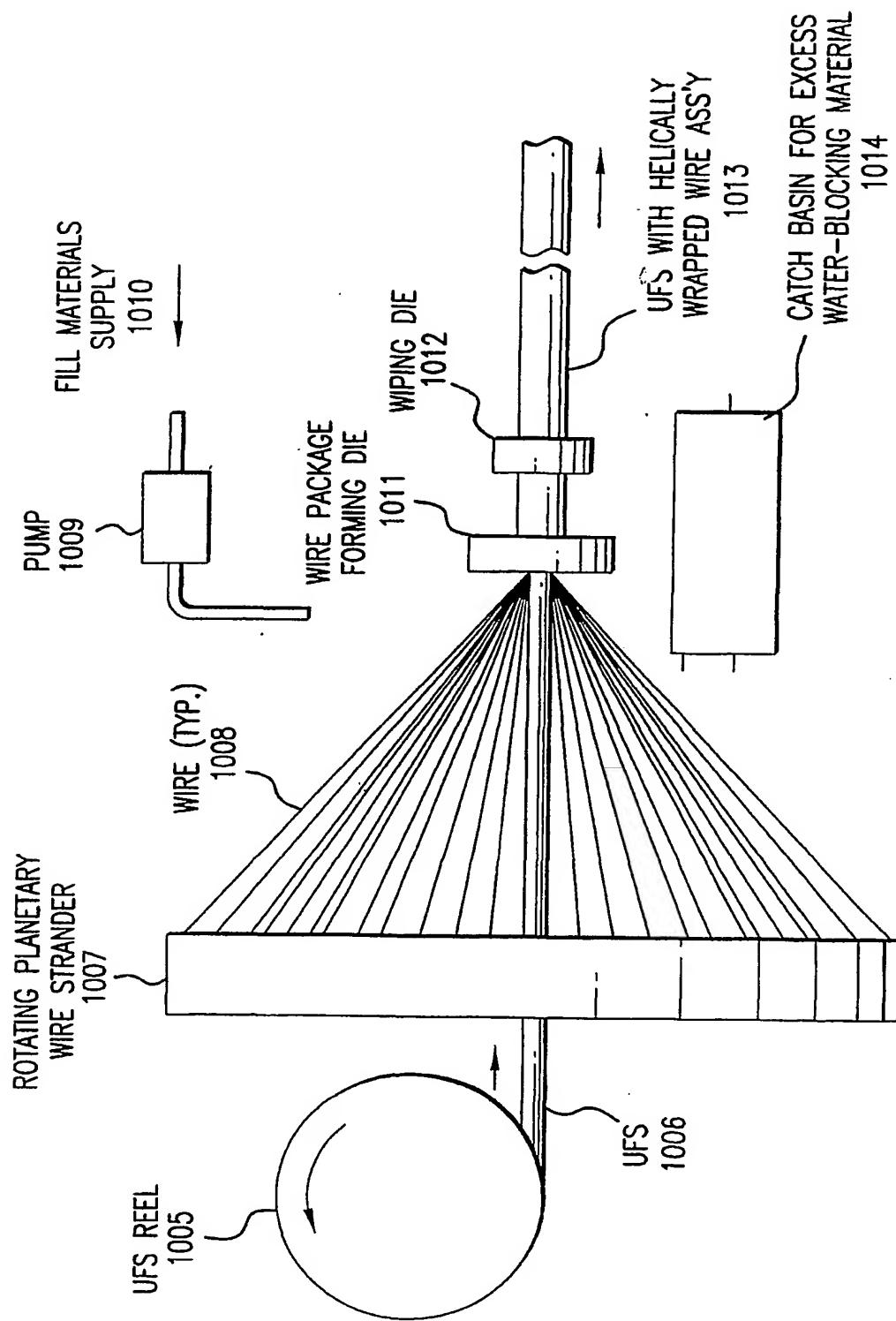


FIG.9

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CABLE WIRE STRANDING/FILL MATERIAL ASSEMBLY
FIG. 10

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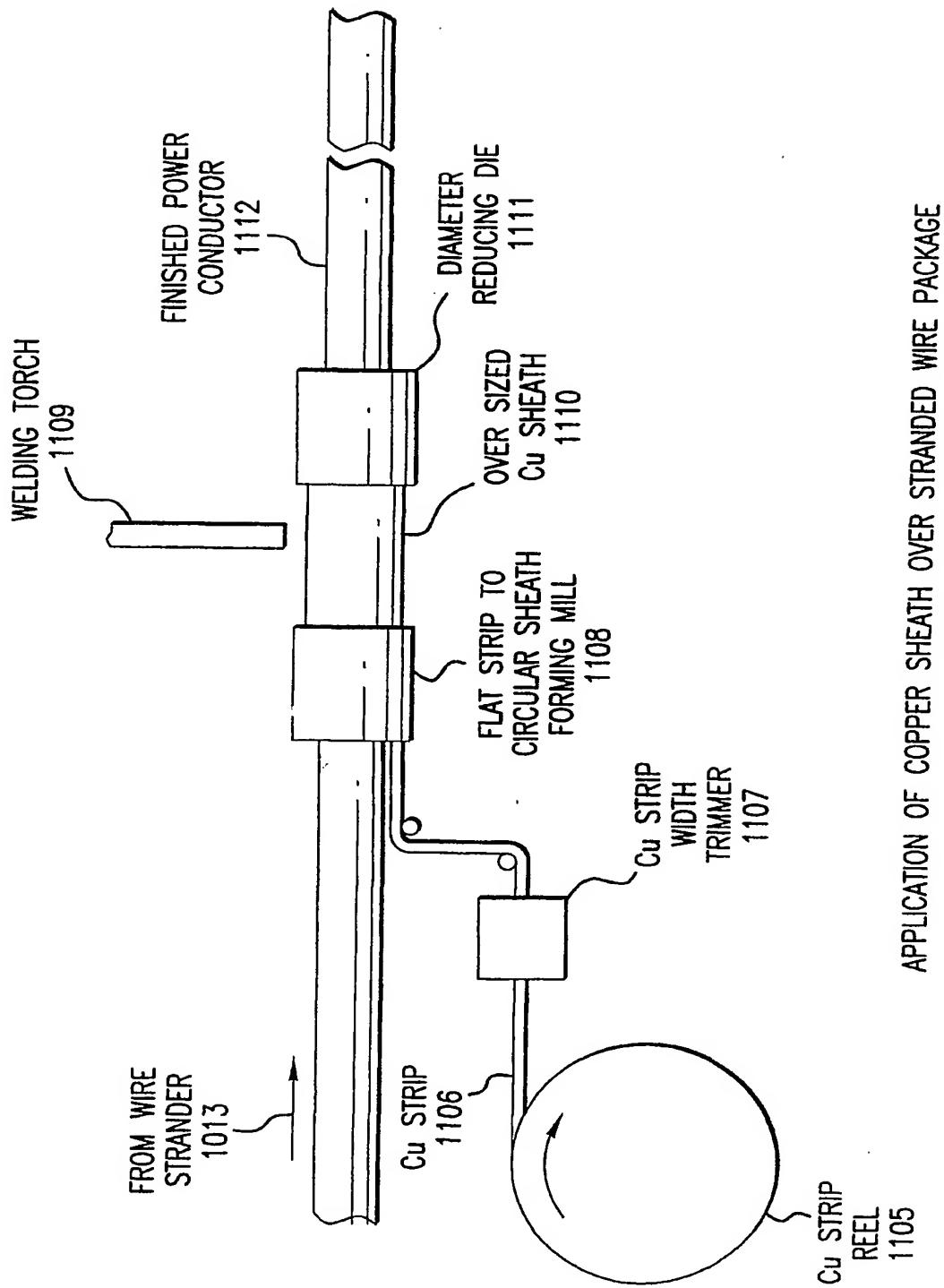


FIG. 11

APPLICATION OF COPPER SHEATH OVER STRANDED WIRE PACKAGE

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